

NORTH CAROLINA  
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES  
DIVISION OF WASTE MANAGEMENT

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03.01-8/17/01-02476



17 August 2001

Mr. S.G. Martin, P.E., Head  
Installation Restoration Section (South)  
Environmental Programs Branch  
Environmental Division

Subject: Fish tissue analysis for dioxins/furans at Operable Units 4 and 13  
at MCAS Cherry Point.

Dear Mr. Martin: *[Signature]*

Thank you for your letter of 20 February concerning OU-4 and OU-13. In this letter of reply, I want to briefly recap your main arguments against fish tissue analyzses, restate our line of thinking that concludes fish tissue sampling is proper at this point, and then propose alternatives that may allow us to continue with the cleanups of OU-4 and OU-13.

Navy Position

You state that available analyzses for dioxins/furans at both operable units show very low concentrations which are below EPA cleanup levels. We agree that the available data shows low concentrations such that neither operable unit poses a hazard to people from direct contact with the soil of the units. We are not concerned about people coming into contact with contaminated soil, but about people eating contaminated fish taken from adjacent streams. This hazard has not been investigated, and the available data indicates that the contamination may have moved from the units to the stream sediments.

Secondly, you state that dioxins/furans are ubiquitous in the environment, and have originated from various sources (pesticide use, for example) over the years. We believe this to be true, also. However, there is good reason to believe that OU-4 and OU-13 may be sources of dioxins/furans to the sediment of the adjacent streams. In addition, the data and information we have seen is not specific about concentrations that constitute "environmental background" dioxins/furans contamination. Generally, the literature calls for very local studies to establish "background" levels of contamination, rather than using published concentrations from remote sites.

Mr. Martin  
17 August 2001  
Page 2

Thirdly, you state that it is unlikely that any dioxins/furans would impact the food chain due to the low concentrations, the propensity for dioxins/furans to bind to soils (and thus not move into the adjacent streams), and the low bioaccumulation potential of the dioxin congeners present. However, the data show that dioxins/furans are already in the sediment of the adjacent tributary to Hancock Creek. As for Mill Creek sediment, there is no data available.

Below criteria/advis? What sed. samples?

Finally, you comment that the state may be inconsistent in requesting fish tissue analyzes in that, to date, only pulp and paper mill operations have prompted fish consumption advisories due to dioxins/furans. Although past state actions may lead you to believe only pulp and paper operations are subject to dioxin assessments, there is no state policy that specifically targets pulp and paper operations for fish consumption advisories nor prohibits fish advisories at other locations.

Many letter  
says dioxin  
in sediment  
below screening  
criteria at  
OU-13

#### State Position

During the investigations of the two subject operable units, it was noted that OU-4 contained flyash disposals and that the landfill at OU-13 reportedly burned. Both units border creeks or tributaries. Since both flyash and burned materials (especially burned chlorinated compounds such as pesticides) are very suspect for containing dioxins/furans, it was reasonable to analyze soil samples from OU-4 and OU-13 and sediment samples from the adjacent tributaries for dioxins/furans.

At OU-4, two soil samples (subsurface flyash) were analyzed for dioxins/furans. The dioxins/furans concentrations, calculated as TEQ concentrations using the accepted World Health Organization method, were 1.211 pg/g and 4.1937 pg/g. Both concentrations are below the US EPA Region III Residential Soil RBC of 4.3 pg/g and below the US EPA residential soil cleanup guidance for dioxins of 1 ppb (1000 pg/g). Both the Region III RBC and the US EPA cleanup guidance concentration are designed to address the oral and dermal exposure pathway to humans.

Based on these data, we conclude that OU-4 contains low concentrations of dioxins/furans in the soil. We further conclude that OU-4 poses no risk to humans from dermal contact with dioxins/furans contaminated soils because the concentrations are below human health risk levels for dermal contact. However, due to the sparsity of the dioxins/furans sampling and the fact that no samples from adjacent Mill Creek, either sediment or surface water, were analyzed for dioxins/furans, we can draw no conclusion from these data about the possible migration of the contaminants into Mill Creek. We are concerned about the migration of contaminants into Mill Creek because we are aware that people take fish for consumption from the creek downstream of OU-4. Therefore, we conclude that there may be a risk to human health from consumption of fish contaminated with dioxins/furans. The available data do not help us assess this potential risk.

Mr. Martin  
17 August 2001  
Page 3

$\sum x = \text{TEQ}$

At OU-13, 50 samples of surface soil, subsurface soil, and stream sediment were analyzed for dioxins/furans. The dioxins/furans concentrations were calculated as TEQ concentrations using the accepted World Health Organization method. Two surface soil samples had TEQ concentrations of dioxins/furans of 451 pg/g and 557 pg/g which are above the EPA Region 9 Industrial Soil PRG of 27 pg/g. However, both of these concentrations are below the US EPA residential soil cleanup guidance for dioxins of 1 ppb (1000 pg/g). We conclude from these data that OU-13 contains dioxins/furans in the surface soil, but at concentrations that probably will not change the remedy for the site, and that the risk to humans from contact with the soil at OU-13 is minimal.

One sediment sample from OU-13 had a dioxins/furans TEQ concentration of 275 pg/g, which is well above the EPA Region 4 Sediment Ecological Screening concentration of 2.5 pg/g. We conclude from these data that there is some evidence of dioxins/furans moving into the tributaries of Hancock Creek from OU-13. Again, we are concerned about the migration of contaminants into Hancock Creek because we are aware that people take fish for consumption from the creek downstream of OU-13. Therefore, we again conclude that there may be a risk to human health from consumption of fish contaminated with dioxins/furans. And again, the available data do not help us assess this potential risk.

In summary, the available data show that both OU-4 and OU-13 are contaminated with dioxins/furans at relatively low concentrations that do not pose appreciable direct contact risks to humans. The single datum for sediment contamination shows dioxins/furans TEQ concentrations over 100 times the concentration that can enter the food web. People take and eat fish from both Mill Creek and from Hancock Creek downstream of the sites. The health risk from dioxins/furans to people who eat fish taken from Mill Creek or Hancock Creek and its tributaries is unknown. The available data do not give us any information with which to sufficiently assess this risk.

### Proposed Alternatives

The most direct way to resolve the question of human health risk from eating contaminated fish is to analyze fish tissue for dioxins/furans. This strategy eliminates all uncertainty about the type of media contaminated, transport of contamination, and bioaccumulation potential. It also eliminates the discussion of "background" dioxins/furans concentrations. (The installation directed us to Table 4-5 of the "Dioxin Reassessment Report", inferring that the information on this table could be interpreted as showing nationwide "background" dioxins/furans concentrations in various media, and illustrating that dioxins/furans are ubiquitous in the environment. However, further examination of the report, including the descriptions of Table 4-5, led us to the conclusion that Table 4-5 is simply a listing of dioxins/furans concentrations taken from a relatively few areas around the country deemed to be "background". Discussions with US EPA Region 4 confirmed our understanding of the data in

Many letter  
sets dioxin  
levels below  
screening criteria  
(unless criteria is for  
human health risk)

TEQ  
Not necessarily  
is soil contain  
near shore

Table 4-5. In short, although there may be "background" concentrations of dioxins/furans in various media, we don't know what those concentrations are.)

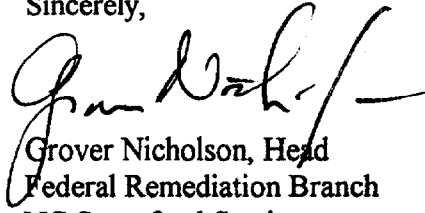
Another strategy we may use to resolve this issue is additional sampling of the sediment of Mill Creek and tributaries of Hancock Creek. Analyzes of samples taken upstream of, adjacent to, and downstream of each of the operable units, followed by bioaccumulation modeling, may allow us to draw one of four possible conclusions (listed below) about the dioxins/furans risk to humans consuming fish from these water bodies. Based on the results of the sediment sampling, we can decide if there is a risk to humans from eating contaminated fish and, if so, what agency should sample and analyze fish tissue.

- A. If sediment samples from all three locations (upstream, adjacent, and downstream) show dioxin/furans concentrations below ecological risk levels, then we can conclude that there is no human health risk from fish consumption.
- B. If all sediment samples from all three locations (upstream, adjacent, and downstream) show dioxins/furans concentrations that are above risk levels, but that are essentially equal, we can conclude that the operable unit is not any greater source of dioxins/furans contamination than the surrounding areas and, therefore, dioxins/furans contamination of the stream is not attributable to the operable unit. If the concentrations are above risk levels, the state may decide to sample the fish tissue to determine if a human health risk is present. If concentrations are high enough, a search may need to be made to locate an upstream source. Fish tissue sampling may still need to be done, depending upon the concentrations of dioxins/furans found, as part of the investigation of the upstream source.
- C. If upstream sediment samples have higher dioxins/furans concentrations than downstream samples, we can conclude that the operable unit is not a source of dioxins/furans. If concentrations are high enough, a search may need to be made for an upstream source. Fish tissue sampling may still need to be done, depending upon the concentrations of dioxins/furans found, as part of the investigation of the upstream source.
- D. If downstream samples have higher dioxins/furans concentrations than upstream samples, we can conclude that the operable unit is a source of dioxins/furans contamination and fish tissue sampling will be necessary to determine any risk to human health from fish consumption.

Mr. Martin  
17 August 2001  
Page 5

If, after sediment analyses are complete, fish tissue sampling is warranted, the state and the US EPA are available to help. Please consider these alternatives. I believe that a workable solution can be found where the cleanup of the operable units will move forward and human health will be fully protected.

Sincerely,

A handwritten signature in black ink, appearing to read "Grover Nicholson", with a long horizontal flourish extending to the right.

Grover Nicholson, Head  
Federal Remediation Branch  
NC Superfund Section

cc: Michele Thornton, US EPA Region 4  
Dale McFarland, MCAS Cherry Point